UNIVERSIDADE ESTADUAL DE SANTA CRUZ

CET058 - COMPILADORES

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Projeto 1 C

Ilhéus/BA 2022

Sumário

IMPLEMENTAÇÃO

Este relatório tem como o objetivo demonstrar um código que simula um leitor de código p-code e executa dentro da máquina/código.

Esse simulador tem como referência o código presente no artigo da wikipedia (link).

Esse código base é desenvolvido em pascal para que simule uma máquina virtual para rodar o portable code machine (P-code). A tarefa foi fazer o mesmo, porém com a linguagem C.

Linguagem Utilizada: C

Inputs permitidos: Serão permitidos arquivos .txt que apresentarem itens compatíveis com a linguagem do P-code que estão pré-definidos como:

- LIT;
- OPR ;
- LOD ;
- STO ;
- CAL ;
- INT ;
- JMP;
- JPC ;

Com os exemplos do código ficará melhor a visualização do funcionamento e disposição das informações.

Tratativa de erros: Ao inserir um .txt que não seja compatível ele irá rodar, porém não executará da maneira desejável. Apresentando no terminal de saída:

```
start pl/0

t   b   p     f   l   a               0   1   2   3   4   5   6   7   8   9  10  11  12  13  14
=== === ===   === === ===           === === === === === === === === === === === === === === ===
 -1   0   0   OPR   0   0      s[] :
=== === ===   === === ===           === === === === === === === === === === === === === === ===
t   b   p     f   l   a               0   1   2   3   4   5   6   7   8   9  10  11  12  13  14
```

Exemplos de códigos:

1. Fatorial:
    a. P-code:

```
1    INT 0 3
2    LIT 0 1
3    STO 0 0
4    LIT 0 2
5    STO 0 1
6    LOD 0 0
7    LOD 0 1
8    OPR 0 4
9    STO 0 2
10   LOD 0 0
11   LOD 0 1
12   OPR 0 2
13   STO 0 1
14   LOD 0 1
15   LOD 0 2
16   OPR 0 4
17   STO 0 2
18   LOD 0 1
19   LIT 0 4
20   OPR 0 8
21   JPC 0 9
22   OPR 0 0
```

Saída do código:

```
start p1/0

 t   b   p    f   l   a              0  1  2  3  4  5  6  7  8  9  10 11 12 13 14
=== === ===  === === ===           === === === === === === === === === === === === === === ===
 -1   0   0  INT   0   4     s[] :   0  0  0  0
  3   0   1  LIT   0   4     s[] :   0  0  0  0  4
  4   0   2  STO   0   7     s[] :   0  0  0  0
  3   0   3  CAL   0   5     s[] :   0  0  0  0
  3   4   5  INT   0   6     s[] :   0  0  0  0  0  0  4  4  0  0
  9   4   6  LIT   0   1     s[] :   0  0  0  0  0  0  4  4  0  0  1
 10   4   7  STO   0   4     s[] :   0  0  0  0  0  0  4  4  1  0
  9   4   8  LIT   0   1     s[] :   0  0  0  0  0  0  4  4  1  0  1
 10   4   9  STO   0   5     s[] :   0  0  0  0  0  0  4  4  1  1
  9   4  10  LOD   0   4     s[] :   0  0  0  0  0  0  4  4  1  1  1
 10   4  11  LOD   0   3     s[] :   0  0  0  0  0  0  4  4  1  1  1  4
 11   4  12  OPR   0  12     s[] :   0  0  0  0  0  0  4  4  1  1  0
 10   4  13  JPC   0  23     s[] :   0  0  0  0  0  0  4  4  1  1  0
 10   4  14  LOD   0   4     s[] :   0  0  0  0  0  0  4  4  1  1  0  1
 11   4  15  LOD   0   5     s[] :   0  0  0  0  0  0  4  4  1  1  0  1  1
 12   4  16  OPR   0   4     s[] :   0  0  0  0  0  0  4  4  1  1  0  1
 11   4  17  STO   0   5     s[] :   0  0  0  0  0  0  4  4  1  1  0
 10   4  18  LOD   0   4     s[] :   0  0  0  0  0  0  4  4  1  1  0  1
 11   4  19  LIT   0   1     s[] :   0  0  0  0  0  0  4  4  1  1  0  1  1
 12   4  20  OPR   0   2     s[] :   0  0  0  0  0  0  4  4  1  1  0  2
 11   4  21  STO   0   4     s[] :   0  0  0  0  0  0  4  4  2  1  0
 10   4  22  JMP   0  10     s[] :   0  0  0  0  0  0  4  4  2  1  0
 10   4  10  LOD   0   4     s[] :   0  0  0  0  0  0  4  4  2  1  0  2
 11   4  11  LOD   0   3     s[] :   0  0  0  0  0  0  4  4  2  1  0  2  4
 12   4  12  OPR   0  12     s[] :   0  0  0  0  0  0  4  4  2  1  0  0
 11   4  13  JPC   0  23     s[] :   0  0  0  0  0  0  4  4  2  1  0  0
 11   4  14  LOD   0   4     s[] :   0  0  0  0  0  0  4  4  2  1  0  0  2
 12   4  15  LOD   0   5     s[] :   0  0  0  0  0  0  4  4  2  1  0  0  2  1
 13   4  16  OPR   0   4     s[] :   0  0  0  0  0  0  4  4  2  1  0  0  2
 12   4  17  STO   0   5     s[] :   0  0  0  0  0  0  4  4  2  2  0  0
 11   4  18  LOD   0   4     s[] :   0  0  0  0  0  0  4  4  2  2  0  0  2
 12   4  19  LIT   0   1     s[] :   0  0  0  0  0  0  4  4  2  2  0  0  2  1
 13   4  20  OPR   0   2     s[] :   0  0  0  0  0  0  4  4  2  2  0  0  3
 12   4  21  STO   0   4     s[] :   0  0  0  0  0  0  4  4  3  2  0  0
 11   4  22  JMP   0  10     s[] :   0  0  0  0  0  0  4  4  3  2  0  0
 11   4  10  LOD   0   4     s[] :   0  0  0  0  0  0  4  4  3  2  0  0  3
```

```
 12   4  11   LOD   0   3      s[] :    0   0   0   0   0   0   4   4   3   2   0   0   3   4
 13   4  12   OPR   0  12      s[] :    0   0   0   0   0   0   4   4   3   2   0   0   0
 12   4  13   JPC   0  23      s[] :    0   0   0   0   0   0   4   4   3   2   0   0   0
 12   4  14   LOD   0   4      s[] :    0   0   0   0   0   0   4   4   3   2   0   0   0   3
 13   4  15   LOD   0   5      s[] :    0   0   0   0   0   0   4   4   3   2   0   0   0   3   2
 14   4  16   OPR   0   4      s[] :    0   0   0   0   0   0   4   4   3   2   0   0   0   6
 13   4  17   STO   0   5      s[] :    0   0   0   0   0   0   4   4   3   6   0   0   0
 12   4  18   LOD   0   4      s[] :    0   0   0   0   0   0   4   4   3   6   0   0   0   3
 13   4  19   LIT   0   1      s[] :    0   0   0   0   0   0   4   4   3   6   0   0   0   3   1
 14   4  20   OPR   0   2      s[] :    0   0   0   0   0   0   4   4   3   6   0   0   0   4
 13   4  21   STO   0   4      s[] :    0   0   0   0   0   0   4   4   4   6   0   0   0
 12   4  22   JMP   0  10      s[] :    0   0   0   0   0   0   4   4   4   6   0   0   0
 12   4  10   LOD   0   4      s[] :    0   0   0   0   0   0   4   4   4   6   0   0   0   4
 13   4  11   LOD   0   3      s[] :    0   0   0   0   0   0   4   4   4   6   0   0   0   4   4
 14   4  12   OPR   0  12      s[] :    0   0   0   0   0   0   4   4   4   6   0   0   0   0
 13   4  13   JPC   0  23      s[] :    0   0   0   0   0   0   4   4   4   6   0   0   0   0
 13   4  14   LOD   0   4      s[] :    0   0   0   0   0   0   4   4   4   6   0   0   0   0   4
 14   4  15   LOD   0   5      s[] :    0   0   0   0   0   0   4   4   4   6   0   0   0   0   4   6
 15   4  16   OPR   0   4      s[] :    0   0   0   0   0   0   4   4   4   6   0   0   0   0  24
 14   4  17   STO   0   5      s[] :    0   0   0   0   0   0   4   4   4  24   0   0   0   0
 13   4  18   LOD   0   4      s[] :    0   0   0   0   0   0   4   4   4  24   0   0   0   0   4
 14   4  19   LIT   0   1      s[] :    0   0   0   0   0   0   4   4   4  24   0   0   0   0   4   1
 15   4  20   OPR   0   2      s[] :    0   0   0   0   0   0   4   4   4  24   0   0   0   0   5
 14   4  21   STO   0   4      s[] :    0   0   0   0   0   0   4   4   5  24   0   0   0   0
 13   4  22   JMP   0  10      s[] :    0   0   0   0   0   0   4   4   5  24   0   0   0   0
 13   4  10   LOD   0   4      s[] :    0   0   0   0   0   0   4   4   5  24   0   0   0   0   5
 14   4  11   LOD   0   3      s[] :    0   0   0   0   0   0   4   4   5  24   0   0   0   0   5   4
 15   4  12   OPR   0  12      s[] :    0   0   0   0   0   0   4   4   5  24   0   0   0   0   1
 14   4  13   JPC   0  23      s[] :    0   0   0   0   0   0   4   4   5  24   0   0   0   0
 13   4  23   OPR   0   0      s[] :    0   0   0   0
  3   0   4   OPR   0   0      s[] :
=== === ===   === === ===           === === === === === === === === === === === === === ===
t   b   p     f   l   a             0   1   2   3   4   5   6   7   8   9  10  11  12  13  14

end pl/0
```

2. Fibonacci
    a. P-code:

```
1   INT 0 4
2   LIT 0 5
3   STO 0 8
4   CAL 0 5
5   OPR 0 0
6   INT 0 7
7   LIT 0 1
8   STO 0 5
9   LIT 0 1
10  STO 0 6
11  LIT 0 3
12  STO 0 3
13  LOD 0 3
14  LOD 0 4
15  OPR 0 12
16  JPC 0 27
17  LOD 0 5
18  LOD 0 6
19  OPR 0 2
20  LOD 0 6
21  STO 0 5
22  STO 0 6
23  LIT 0 1
24  LOD 0 3
25  OPR 0 2
26  STO 0 3
27  JMP 0 12
28  OPR 0 0
```

b. Saída do código:

```
start p1/0

 t   b   p    f   l   a              0  1  2  3  4  5  6  7  8  9 10 11 12 13 14
=== === ===  === === ===           === === === === === === === === === === === === === ===
 -1   0   0  INT   0   4     s[] :   0  0  0  0
  3   0   1  LIT   0   5     s[] :   0  0  0  0  5
  4   0   2  STO   0   8     s[] :   0  0  0  0
  3   0   3  CAL   0   5     s[] :   0  0  0  0
  3   4   5  INT   0   7     s[] :   0  0  0  0  0  0  4  0  5  0  0
 10   4   6  LIT   0   1     s[] :   0  0  0  0  0  0  4  0  5  0  0  1
 11   4   7  STO   0   5     s[] :   0  0  0  0  0  0  4  0  5  1  0
 10   4   8  LIT   0   1     s[] :   0  0  0  0  0  0  4  0  5  1  0  1
 11   4   9  STO   0   6     s[] :   0  0  0  0  0  0  4  0  5  1  1
 10   4  10  LIT   0   3     s[] :   0  0  0  0  0  0  4  0  5  1  1  3
 11   4  11  STO   0   3     s[] :   0  0  0  0  0  0  4  3  5  1  1
 10   4  12  LOD   0   3     s[] :   0  0  0  0  0  0  4  3  5  1  1  3
 11   4  13  LOD   0   4     s[] :   0  0  0  0  0  0  4  3  5  1  1  3  5
 12   4  14  OPR   0  12     s[] :   0  0  0  0  0  0  4  3  5  1  1  0
 11   4  15  JPC   0  27     s[] :   0  0  0  0  0  0  4  3  5  1  1  0
 11   4  16  LOD   0   5     s[] :   0  0  0  0  0  0  4  3  5  1  1  0  1
 12   4  17  LOD   0   6     s[] :   0  0  0  0  0  0  4  3  5  1  1  0  1  1
 13   4  18  OPR   0   2     s[] :   0  0  0  0  0  0  4  3  5  1  1  0  2
 12   4  19  LOD   0   6     s[] :   0  0  0  0  0  0  4  3  5  1  1  0  2  1
 13   4  20  STO   0   5     s[] :   0  0  0  0  0  0  4  3  5  1  1  0  2
 12   4  21  STO   0   6     s[] :   0  0  0  0  0  0  4  3  5  1  2  0
 11   4  22  LIT   0   1     s[] :   0  0  0  0  0  0  4  3  5  1  2  0  1
 12   4  23  LOD   0   3     s[] :   0  0  0  0  0  0  4  3  5  1  2  0  1  3
 13   4  24  OPR   0   2     s[] :   0  0  0  0  0  0  4  3  5  1  2  0  4
 12   4  25  STO   0   3     s[] :   0  0  0  0  0  0  4  4  5  1  2  0
 11   4  26  JMP   0  12     s[] :   0  0  0  0  0  0  4  4  5  1  2  0
 11   4  12  LOD   0   3     s[] :   0  0  0  0  0  0  4  4  5  1  2  0  4
 12   4  13  LOD   0   4     s[] :   0  0  0  0  0  0  4  4  5  1  2  0  4  5
 13   4  14  OPR   0  12     s[] :   0  0  0  0  0  0  4  4  5  1  2  0  0
 12   4  15  JPC   0  27     s[] :   0  0  0  0  0  0  4  4  5  1  2  0  0
 12   4  16  LOD   0   5     s[] :   0  0  0  0  0  0  4  4  5  1  2  0  0  1
 13   4  17  LOD   0   6     s[] :   0  0  0  0  0  0  4  4  5  1  2  0  0  1  2
 14   4  18  OPR   0   2     s[] :   0  0  0  0  0  0  4  4  5  1  2  0  0  3
 13   4  19  LOD   0   6     s[] :   0  0  0  0  0  0  4  4  5  1  2  0  0  3  2
 14   4  20  STO   0   5     s[] :   0  0  0  0  0  0  4  4  5  2  2  0  0  3
 13   4  21  STO   0   6     s[] :   0  0  0  0  0  0  4  4  5  2  3  0  0
 12   4  22  LIT   0   1     s[] :   0  0  0  0  0  0  4  4  5  2  3  0  0  1
 13   4  23  LOD   0   3     s[] :   0  0  0  0  0  0  4  4  5  2  3  0  0  1  4
 14   4  24  OPR   0   2     s[] :   0  0  0  0  0  0  4  4  5  2  3  0  0  5
 13   4  25  STO   0   3     s[] :   0  0  0  0  0  0  4  5  5  2  3  0  0
 12   4  26  JMP   0  12     s[] :   0  0  0  0  0  0  4  5  5  2  3  0  0
 12   4  12  LOD   0   3     s[] :   0  0  0  0  0  0  4  5  5  2  3  0  0  5
 13   4  13  LOD   0   4     s[] :   0  0  0  0  0  0  4  5  5  2  3  0  0  5  5
 14   4  14  OPR   0  12     s[] :   0  0  0  0  0  0  4  5  5  2  3  0  0  0
 13   4  15  JPC   0  27     s[] :   0  0  0  0  0  0  4  5  5  2  3  0  0  0
 13   4  16  LOD   0   5     s[] :   0  0  0  0  0  0  4  5  5  2  3  0  0  0  2
 14   4  17  LOD   0   6     s[] :   0  0  0  0  0  0  4  5  5  2  3  0  0  0  2  3
 15   4  18  OPR   0   2     s[] :   0  0  0  0  0  0  4  5  5  2  3  0  0  0  5
 14   4  19  LOD   0   6     s[] :   0  0  0  0  0  0  4  5  5  2  3  0  0  0  5  3
 15   4  20  STO   0   5     s[] :   0  0  0  0  0  0  4  5  5  3  3  0  0  0  5
 14   4  21  STO   0   6     s[] :   0  0  0  0  0  0  4  5  5  3  5  0  0  0
 13   4  22  LIT   0   1     s[] :   0  0  0  0  0  0  4  5  5  3  5  0  0  0  1
 14   4  23  LOD   0   3     s[] :   0  0  0  0  0  0  4  5  5  3  5  0  0  0  1  5
 15   4  24  OPR   0   2     s[] :   0  0  0  0  0  0  4  5  5  3  5  0  0  0  6
 14   4  25  STO   0   3     s[] :   0  0  0  0  0  0  4  6  5  3  5  0  0  0
 13   4  26  JMP   0  12     s[] :   0  0  0  0  0  0  4  6  5  3  5  0  0  0
 13   4  12  LOD   0   3     s[] :   0  0  0  0  0  0  4  6  5  3  5  0  0  0  6
 14   4  13  LOD   0   4     s[] :   0  0  0  0  0  0  4  6  5  3  5  0  0  0  6  5
 15   4  14  OPR   0  12     s[] :   0  0  0  0  0  0  4  6  5  3  5  0  0  0  1
 14   4  15  JPC   0  27     s[] :   0  0  0  0  0  0  4  6  5  3  5  0  0  0
 13   4  27  OPR   0   0     s[] :   0  0  0  0
  3   0   4  OPR   0   0     s[] :
=== === ===  === === ===           === === === === === === === === === === === === === ===
 t   b   p    f   l   a              0  1  2  3  4  5  6  7  8  9 10 11 12 13 14
```

Link para download do código:

https://github.com/LeoDNascimento/Compiladores/tree/main/Atividade1c

Referências:

p-code machine. Disponível em: https://en.wikipedia.org/wiki/P-code_machine